

Check AI dan Similarity

Azmi__sc_mp8zxfdn_7nk2

By Turnitin LLC

WORD COUNT

3149

TIME SUBMITTED

17-MAY-2026 06:47AM

PAPER ID

121634221

THE EFFECT OF PAIRED VARIATION EXERCISES ON IMPROVE PASSING ACCURACY AND COORDINATION IN FOOTBALL

*Azmi Syaiful Azhar¹, Anggi Setia Lengkana², Entan Saptani³

ABSTRAK

This study aimed to determine whether paired variation exercises improve passing accuracy and coordination in football games among primary school pupils. A one-group pretest-posttest design was employed for the study. The sample consisted of 30 elementary school students from grades 4 and 5 selected using purposive sampling. The tests used were the short passing accuracy test and the passing coordination test. The intervention involved paired variation exercises conducted over 12 sessions. Data were analysed using normality and homogeneity tests, paired-samples t-tests and determination coefficients. The results showed that the paired variation exercises significantly improved passing accuracy ($p < 0.001$), contributing 68.7% to this improvement. Additionally, paired variation exercises were found to significantly improve passing coordination ($p < 0.001$), contributing 82.7%. These findings suggest that paired variation exercises effectively improve students' passing skills in terms of both accuracy and coordination in football games.

Keyword: paired variation exercises, passing accuracy, passing coordination, football

INTRODUCTION

Football is one of the most popular sports among primary school pupils and is widely taught in PE lessons because it helps to develop fundamental movement skills, particularly manipulative motor skills such as kicking, controlling and passing the ball. At this level, passing skills are important because they form the basis for maintaining possession of the ball, fostering teamwork, and facilitating decision-making during games. According to (Lengkana et al., 2017) mastering fundamental motor skills during childhood is important for children's physical development and future participation in sports. In football, passing is considered one of the main techniques that must be mastered, as it influences the flow and effectiveness of the game (Soniawan & Irawan, 2018). Therefore, passing techniques need to be taught to elementary school students through training methods appropriate to their motor development.

In Sumedang, many elementary school students are interested in football, but struggle to master basic passing techniques. Initial observations conducted at SDN Rancakalong revealed that some students struggled to direct the ball accurately, adjust their kicking force and coordinate their body movements when passing. Consequently, the ball often failed to reach teammates or deviated from the intended target. These problems are closely related to children's motor coordination, which is still developing (Fauzi et al., 2023). In addition, football learning activities in schools still frequently rely on conventional instructional methods and repetitive drills, in which students perform the same movements repeatedly without engaging in meaningful gameplay. According to (Education, 2014) a lack of variation in repetitive technical drills may reduce students' motivation and active involvement in learning activities. Consequently, students' passing accuracy and coordination skills may not develop optimally.

The limitations of conventional football teaching methods highlight the need for more innovative and student-centred pedagogical approaches in physical education. Elementary school students tend to learn movement skills more effectively through active, enjoyable and varied learning experiences. Recent studies have shown that game-based and student-centred learning approaches can improve motor skill development, student engagement and tactical understanding more effectively than traditional technique-based instruction (Greve et al., 2022) explained that interactive and game-based learning

approaches can improve students' technical skills, participation and tactical understanding in sports learning. In addition, varied learning activities help students to stay motivated and reduce boredom during practice sessions. Therefore, football training requires methods that emphasise not only repetitive technical exercises, but also the creation of dynamic learning situations that resemble real game conditions.

From the perspective of contemporary sports pedagogy, peer interaction and feedback are considered important learning components because they encourage active engagement, self-reflection, and collaborative problem-solving during physical activities. (Casey et al., 2018) argue that student-centred learning approaches involving peer communication and shared decision-making can enhance technical skill acquisition and learning motivation in physical education contexts. Implementing passing exercises with targets, triangle passing, passing with obstacles, one-touch passing and small-sided games allows students to improve their coordination, concentration and adaptability during football matches. These varied activities are expected to make learning more enjoyable and effective for primary school pupils.

Several previous studies have examined football passing training using different approaches. For example, research conducted by Irawan et al. (2019) found that drill methods significantly improved the ability to pass using the inside foot, outside foot and instep techniques. (Reiza & Sumartiningsih, 2024) also reported that back-pass training methods improved short passing accuracy among football school players. Furthermore, (Wicaksana et al., 2021) demonstrated that rondo games and give-and-go passing drills enhance passing accuracy among young football players. Other studies have also emphasised the significant contribution of eye-foot coordination to passing performance in football (Fahrizqi et al., 2018). However, most previous studies have focused on drill training methods, tactical game approaches or adolescent football players. Research specifically examining the effect of paired variation exercises on passing accuracy and coordination among primary school students is limited. Therefore, this study aims to analyse the effect of paired variation exercises on improving passing accuracy and coordination in football games among elementary school students at SDN Rancakalong in Sumedang.

6 METHOD

This study employed a quantitative experimental approach with a one-group pre-test/post-test design. The study examined the impact of paired variation exercises on passing accuracy and coordination during football games among primary school pupils. The intervention involved paired variation exercises conducted over 12 meetings.

The participants were 30 elementary school students from Years 4 and 5 SDN Rancakalong in Sumedang. The sample consisted of 18 boys and 12 girls, aged between 9 and 11. The sample was selected using purposive sampling based on the following inclusion criteria: (1) active participation in physical education, (2) physical health and the ability to participate in football activities, and (3) basic football skills, particularly passing techniques.

Data were collected using passing accuracy and passing coordination tests. Passing accuracy was measured using a short passing test adapted from (Persiwu & Jatiyoso, n.d.), in which students were instructed to kick the ball towards a target goal from a set distance. Each student made four attempts using their dominant foot; successful kicks that entered the target area received 15 points, while unsuccessful attempts received 0 points. Passing coordination was measured using the David Lee Soccer Test, which was developed by the Australian Soccer Federation (Löwe et al., 2022). This test required students to perform various movement sequences, such as ball juggling, dribbling through cones, short and long passing, and finishing, all within the fastest possible time. The coordination instrument showed

high validity values ranging from 0.963 to 0.998, as well as a reliability coefficient (Cronbach's alpha) of 0.989.

The collected data were analysed using SPSS software. The analysis included normality and homogeneity tests, paired-samples t-tests to determine the significance of the intervention effect and R-square coefficients to identify the contribution of the paired variation exercises to improvements in passing accuracy and coordination.

Passing coordination was measured using the David Lee Soccer Test developed by the Australian Soccer Federation. The test required participants to complete several movement sequences, including ball juggling, dribbling through eight cones, short passing, long passing, and ball control tasks before reaching the finish area. The final score was determined on the fastest completion time recorded in seconds. Each participant was given two opportunities, and the best result was used for analysis.

The collected data were analysed using IBM SPSS Statistics version 26. Descriptive statistics were used to summarise the data, including mean and standard deviation values. Prior to hypothesis testing, prerequisite tests consisting of the Shapiro-Wilk normality test and homogeneity test were conducted to determine whether the data met the assumptions for parametric analysis. Hypothesis testing was then performed using paired-samples t-tests to examine the differences between the pre- and post-test scores. The level of significance used in this study was set at $p < 0.05$. Additionally, the coefficient of determination (R^2) was calculated to determine the contribution of paired variation exercises to improvements in passing accuracy and coordination.

RESULTS

Students' passing accuracy and coordination improved after participating in the paired variation exercise programme. In the passing accuracy variable, the mean pre-test score was lower than the post-test score, indicating improvement in the ability to direct the ball accurately towards the target following the intervention. Similarly, the mean post-test score for passing coordination showed better performance than the pre-test results, indicating improvements in students' coordination abilities during football passing activities.

The Shapiro-Wilk normality test indicated that the pre-test and post-test data for both passing accuracy and passing coordination were normally distributed, as all significance values were greater than 0.05. Additionally, the homogeneity test results showed that the data variance was homogeneous, meaning that the data met the assumptions required for parametric statistical analysis.

Paired-samples t-test results demonstrated a significant effect of paired variation exercises on passing accuracy. The analysis showed a significance value of $p < 0.001$, indicating a statistically significant difference between the pre-test and post-test scores. Further analysis using the coefficient of determination showed that paired variation exercises contributed 68.7% to the improvement in passing accuracy.

Similarly, the paired-samples t-test results for passing coordination revealed a significant improvement after the implementation of paired variation exercises. The significance value obtained was $p < 0.001$, indicating a meaningful difference between students' pre- and post-test coordination scores. Furthermore, the coefficient of determination analysis showed that paired variation exercises contributed to the improvement in passing coordination.

Passing accuracy

Passing accuracy is a fundamental football skill because it is closely related to ball possession and

teamwork. In this study, passing accuracy was measured before and after the intervention to determine improvement in students' abilities.

Based on the Kolmogorov-Smirnov normality test results, the significance values for the pre-test and post-test passing accuracy data were 0.116 and 0.352, respectively. Since both significance values were higher than 0.05, the data were normally distributed. Therefore, the paired-samples t-test was considered appropriate for hypothesis testing.

Based on the results of the paired-samples t-test, a significance value of 0.000 ($p < 0.05$) was obtained, indicating a statistically significant difference in passing accuracy scores between the pre-test and post-test. Therefore, it can be concluded that the paired variation exercise programme significantly improved students' passing accuracy.

The mean difference value of -8.86667 indicates that post-test scores were higher than pre-test scores following the intervention programme. The negative value reflects the direction of improvement between the two measurements. Furthermore, the calculated t-value of -27.052 demonstrates that the improvement in passing accuracy was highly statistically significant.

As shown in Figure 1, the post-test mean score was noticeably higher than the pre-test mean score. The error bars representing the standard deviation also showed consistent improvement in passing accuracy among students following the training programme.

Passing coordination

Passing coordination is the ability to integrate body movements, particularly the coordination between visual control and foot movements, when passing. This ability is important in football because it supports effective and accurate passing during the game.

Based on the results of the normality test, the significance values for the pre-test and post-test were 0.114 and 0.380, respectively. As both values were greater than 0.05, it can be concluded that the passing coordination data were normally distributed. Therefore, the data met the assumptions required for parametric statistical analysis.

The results of the paired-samples t-test showed a significance value of 0.000 ($p < 0.05$), indicating a significant difference in passing coordination between the pre-test and post-test scores. These findings demonstrate that paired variation exercises significantly improved students' passing coordination.

A mean difference value of -3.10000 indicates that the post-test score was lower than the pre-test score. In the David Lee Soccer Test, lower completion times indicate better coordination performance. Therefore, the decrease in scores after the exercises were implemented reflects an improvement in students' coordination abilities. Furthermore, the calculated t-value of -9.820 showed that the difference between the pre- and post-test scores was statistically significant.

The results of the coefficient of determination analysis showed an R-square value of 0.827, indicating that 82.7% of the improvement in passing coordination was influenced by the paired variation exercise programme, while the remaining 17.3% was influenced by factors outside the scope of the study. Additionally, the correlation coefficient ($R = 0.909$) revealed a strong positive relationship between the exercises and improvements in passing coordination.

DISCUSSION

The findings of this study suggest that paired variation exercises effectively improved passing

accuracy and coordination among primary school students. This improvement occurred because the exercises created a more active, varied and interactive learning environment than conventional, repetitive drills. Throughout the learning process, students were continuously involved in cooperative, focused and quick decision-making activities while interacting directly with their partners. These conditions encouraged students to participate more actively in football activities and provided broader opportunities for repeated movement experiences in various game situations. Recent studies in sports pedagogy suggest that game-based, student-centred learning approaches are more effective in developing motor skills, tactical understanding, and student engagement than traditional, technique-based instruction (Greve et al., 2022). Furthermore, primary school students tend to learn movement skills more effectively through enjoyable, meaningful and interactive learning experiences than through monotonous technical repetition.

According to contemporary motor learning theory, skill acquisition is more effective when learners practise movements in environments that are both variable and representative of actual game situations (Davids et al., 2021). Such variable practice enables learners to adapt their movements continuously according to changing task demands, thereby improving the accuracy of their movements and their decision-making abilities during football activities.

In this study, students not only repeated passing movements, but also practised passing in different situations such as passing with targets, one-touch passing, triangle passing and passing during small-sided games. These variations in movement allowed students to continuously adjust force control, passing direction, body balance and timing during practice. Consequently, students gradually developed better passing precision and ball control.

The findings also showed that passing coordination improved significantly following the introduction of paired variation exercises. This suggests that paired activities effectively stimulate the integration of visual control, foot movement, and body balance when learning football. Recent studies suggest that coordination skills develop most effectively through structured, game-based movement activities that encourage perceptual-motor adaptation, balance control, and movement efficiency in children (Giuriato et al., 2021). Furthermore, motor coordination is considered an essential foundation for developing more complex, sport-specific skills during childhood and adolescence. In the context of football learning among elementary school students, coordination development generally occurs more rapidly than movement accuracy because coordination primarily involves gross motor control, whereas passing accuracy necessitates a higher level of movement precision and motor control adjustment (Logan et al., 2018). Therefore, it is reasonable that paired variation exercises contributed more to coordination improvement than to passing accuracy.

The implementation of paired variation exercises also supported the development of perceptual-motor abilities among students. During these activities, students had to observe their partners' movements, estimate the direction of the ball, and respond quickly to changing situations. This process simultaneously trains eye-foot coordination, reaction speed and movement synchronisation. Exercises such as one-touch passing and small-sided games encouraged students to make faster decisions while maintaining control of their movements. According to (Jones et al., 2016), training activities involving interaction, decision-making and movement adaptation are more effective in acquiring motor skills among young football players than isolated technical drills. This suggests that interaction during paired exercises plays an important role in improving students' passing coordination.

2 Another important finding of this study is that varied exercises helped to reduce boredom and increase motivation among students during learning activities. Elementary school students generally have shorter attention spans and become disengaged more easily when learning activities are repetitive and monotonous. By carrying out different paired exercises, the students experienced various movement challenges and game situations at each meeting, which made the learning activities more enjoyable and engaging. This is important because enjoyable learning experiences can increase students' intrinsic motivation to participate in physical education activities (Koordinasi et al., 2018). In the long term, varied

and enjoyable exercises may also help to prevent psychological burnout and training fatigue among young athletes, as they do not perform the same repetitive movements continuously during practice sessions.

2

The results of this study are consistent with those of several previous national studies. For example, (Widaningsih et al., 2024) found that varied football exercises improved students' motor skills and active participation in physical education. Similarly (Gulo et al., 2024) found that game-based football learning methods were more effective than conventional drills in improving students' football skills. (Pangestoe et al., 2023) also found that exercises involving movement variations improved students' understanding of techniques and their application in game situations. These findings reinforce the idea that varied, interactive training approaches offer students more meaningful movement experiences than isolated technical exercises.

From a practical perspective, the findings of this study suggest that paired variation exercises could be used as an alternative teaching method in primary school PE, particularly for learning football. Implementing varied paired activities improves technical skills and supports the development of coordination, cooperation, concentration and active participation among students. Furthermore, this approach fosters a more enjoyable learning environment, which is crucial for sustaining students' interest and motivation in sports activities. Therefore, physical education teachers are encouraged to implement more varied and interactive football learning methods to support students' motor development and encourage long-term participation in physical activity.

4

CONCLUSION

Based on the results of this study, it can be concluded that paired variation exercises effectively improved passing accuracy and coordination among primary school students. Significant improvements in students' passing abilities were observed after they participated in the training programme. The exercises provided meaningful movement experiences through varied, interactive passing activities that supported the development of basic football skills. The results also indicated that paired variation exercises had a greater effect on passing coordination than on passing accuracy. This suggests that varied paired activities are more effective in developing coordination, particularly the integration of visual control, foot movement and body balance, during passing activities. Improvements in passing accuracy also occurred, although developing movement precision requires more consistent adaptation and motor control.

From a practical perspective, paired variation exercises can be recommended as an alternative learning method in physical education, particularly for learning football at elementary school level. By incorporating varied paired activities such as target passing, one-touch passing, triangle passing and small-sided games, teachers can foster more active and contextualised learning environments that promote the development of students' football skills. This study has several limitations. The research used a one-group pre-test post-test design without a control group, so it was not possible to conduct direct comparisons with other training methods. Additionally, the sample size was limited to primary school students from one school, which may restrict the generalisation of the findings. Therefore, future studies involving larger samples, control groups and other variables related to football learning, such as tactical understanding and decision-making ability, are recommended.

Check AI dan Similarity Azmi__sc_mp8zxfdn_7nk2

ORIGINALITY REPORT

16%

SIMILARITY INDEX

PRIMARY SOURCES

1	dev-journal.iainlangsa.ac.id Internet	68 words — 2%
2	Hurriyati Ratih, Tjahjono Benny, GafarAbdullah Ade, Sulastri, Lisnawati. "Advances in Business, Management and Entrepreneurship", CRC Press, 2020 Publications	40 words — 1%
3	ojspanel.undikma.ac.id Internet	37 words — 1%
4	Rahmi Amtha, Ferry Sandra, Rosalina Tjandrawinata, Indrayadi Gunardi, Anggraeny Putri Sekar Palupi. "Current Research and Trends in Dental and Medical Technology", CRC Press, 2025 Publications	31 words — 1%
5	Siti Sarah Nurlaela, Muhammad Hidayat, Rini Dwi Septiyani, Siti Uswatun Khasanah, Ferri Yonantha. "Mindful Speed Reading: Adapting Mindfulness Practices for Improving Comprehension", Loquen: English Studies Journal, 2025 Crossref	30 words — 1%
6	proceeding.unisayogya.ac.id Internet	27 words — 1%
7	ejournal.unesa.ac.id Internet	23 words — 1%
8	ijemd.umsida.ac.id	

21 words — 1%

9 journal.unnes.ac.id
Internet

19 words — 1%

10 jnasr.iuokada.edu.ng
Internet

18 words — 1%

11 Reni Dwi Susanti, Marhan Taufik, Hendarto Cahyono, Buaddin Hasan. "Integrating Python Programming Within A Multiple Representation Framework To Enhance Student Mathematical Numeracy", Jurnal Pendidikan MIPA, 2026
Crossref

16 words — < 1%

12 publications.ayu.edu.kz
Internet

15 words — < 1%

13 journalwjarr.com
Internet

14 words — < 1%

14 www.communitynursing.net
Internet

14 words — < 1%

15 repository.uin-suska.ac.id
Internet

13 words — < 1%

16 etd.lsu.edu
Internet

12 words — < 1%

17 ojs.unpkediri.ac.id
Internet

12 words — < 1%

18 www.ncbi.nlm.nih.gov
Internet

12 words — < 1%

19 Luigi Nasta. "Chapter 3 Access Versus Exclusivity in the Digital Creative and Cultural Landscape",

11 words — < 1%

-
- 20 Sani Rahman, Ridwan Mustopa, Hanifa Addawiah, Detya Wiryany. "The Influence of the Use of Instagram Info Garut Media on the Trust of Garut University Students", *Communica : Journal of Communication*, 2026
Crossref 10 words — < 1%
-
- 21 jurnal.fs.umi.ac.id
Internet 10 words — < 1%
-
- 22 Megan Hetherington-Rauth, Chiara G. Leu, Pedro B. Júdice, Inês R. Correia, João P. Magalhães, Luís B. Sardinha. "Whole body and regional phase angle as indicators of muscular performance in athletes", *European Journal of Sport Science*, 2021
Crossref 9 words — < 1%
-
- 23 Trisnawati Manik, Laily Ramadhani, Lapiti Gokmatua Sagala. "Impact of Liquidity Ratio and Solvency Ratio on the Profitability Ratio in PT.Indofood Sukses Makmur", *Global Insights in Management and Economic Research*, 2025
Crossref 9 words — < 1%
-
- 24 prosiding.unirow.ac.id
Internet 9 words — < 1%
-
- 25 journal2.upgris.ac.id
Internet 8 words — < 1%
-
- 26 ojs.unm.ac.id
Internet 8 words — < 1%
-
- 27 www.journal.privietlab.org
Internet 8 words — < 1%

EXCLUDE QUOTES ON

EXCLUDE BIBLIOGRAPHY ON

EXCLUDE SOURCES OFF

EXCLUDE MATCHES OFF